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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/696,327

10/28/2003

David Alan Burton

Pillar 715

8089

7590

05/17/2006

Robert Moll
1173 St. Charles Court
Los Altos, CA 94024

EXAMINER

ALAM, SHAHID AL

ART UNIT

PAPER NUMBER

2162

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/696,327

Applicant(s)

BURTON ET AL.

Examiner

Shahid Al Alam

Art Unit

2162

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>04122004; 04052006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Claims 1 – 27 are pending in this Office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Number 6,173,377 issued to Moshe Yanai et al. ("Yanai") in view of U.S. Patent Number 6,772,178 issued to Chhandomay Mandal et al. ("Mandal").

With respect to claim 1, Yanai discloses a method of data replication, wherein one or more applications send write commands to a primary host (see abstract), comprising:

at the primary host:

acknowledging each write command before transmitting the write command to a secondary host (column 5, lines 36 – 39 and column 10, lines 11 – 19);

assigning a data set ID to each write command (column 47, line 25 – column 48, line 67);

transmitting each write command before the application has sent all of the write commands of the data set to the primary host (column 5, lines 36 – 50);

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assigning the data set ID to a sync command (column 47, line 25 – column 48, line 67);

transmitting the sync command, wherein the write commands and the sync command define a data set (column 5, lines 36 – 50);

at the secondary host: receiving the write commands and sync command out of order; and writing the data set to a storage coupled to the secondary host (column 5, lines 36 – 50 and column 7, line 63 – column 8, line 3).

Yanai teaches asynchronous replication system substantially as claimed. However, Yanai does not explicitly teach asynchronous data replication over a network as claimed.

Mandal teaches claimed asynchronous data replication over a network (see abstract, Figure 13, column 2, lines 22 – 24 and column 5, lines 19 – 22).

It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to combine the teachings of Mandal with the teachings of Yanai so that a data processing system could automatically and asynchronously, with respect to a first host system, generates and maintains a backup or mirrored copy of a primary storage device at a location physically remote from the primary storage device without intervention from the host computer. The combination would provide a simple, fast way to set up and manage a data replication system among resources that may be located anywhere in a distributed system and to provide coordination information to a manager who may also be located anywhere in the system.

As to claim 2, tracking the receipt of write and sync commands at the secondary host (see Figure 1 and corresponding text; Yanai).

As to claim 3, assigning a unique sequence number for each write command and another sequence number to the sync command at the primary host (see Figure 1 and corresponding text; Yanai).

As to claim 4, tracking the receipt of write and sync commands includes setting bits in an identifier bitmap corresponding to the data set at the secondary host (see Figure 1 and corresponding text; Yanai).

As to claim 5, writing the blocks to a secondary target VLUN and acknowledging the write and sync commands before receipt of the data set at secondary host (column 2, lines 22 – 24 and column 5, lines 18 – 20; Mandal);

As to claim 6, storing multiple versions of one of the blocks at the primary host while waiting for an acknowledgement from the secondary host (column 2, lines 22 – 24 and column 5, lines 18 – 20; Mandal);

As to claim 7, using the identifier bitmap to determine receipt of the data set at the secondary host (column 5, lines 28 – 35; Yanai).

As to claim 8, updating a data structure at the secondary host to track the blocks in the secondary target VLUN (see Figure 18 and also column 32, line 55 – column 33, line 6; Yanai).

As to claim 9, updating the data structure at the secondary host includes setting bits in a bitmap and updating a log file (see Figure 18 and also column 32, line 55 – column 33, line 6, column 35, lines 4 – 20; Yanai).

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As to claim 10, writing the blocks to a memory buffer at the secondary host and acknowledging the write and sync commands at the secondary host before receipt of the data set (column 5, lines 36 – 39 and column 10, lines 11 – 19; Yanai);

As to claim 11, the step of receiving at the secondary host includes receiving write commands belonging to a plurality of data sets that are overlapping with respect to each other (column 5, lines 36 – 50 and column 7, line 63 – column 8, line 3; Yanai).

As to claim 12, receiving a second data set at the secondary host, wherein the step of receiving write commands for the second data set precedes receiving write commands of the data set (column 5, lines 36 – 50 and column 7, line 63 – column 8, line 3; Yanai).

As to claim 13, storing the data sets in a plurality of data structures (see Figure 18 and corresponding text; Yanai).

As to claims 14 and 15, transmitting the write and sync commands on the network using the Fibre channel protocol and the iSCSI protocol (column 5, lines 19 – 24; Mandal).

As to claim 16, the step of writing includes the secondary host writing the blocks of the data set to the secondary source VLUN (see Figure 18 and corresponding text; Yanai).

As to claim 17, the data set contains one or more file system transactions (column 5, lines 37 – 50; Yanai).

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The subject matter of claims 18 – 27 are rejected in the analysis above in claims 1 – 17 and these claims are rejected on that basis.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shahid Al Alam whose telephone number is (571) 272-4030. The examiner can normally be reached on Monday-Thursday 8:00 A.M.- 4:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shahid Al Alam
Primary Examiner
Art Unit 2162

14 May 2006